



MINE DUST
NETWORK



Understanding and Mitigating Mine Dust Impacts: Lessons Learned through Multi-Stakeholder Engagement

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Knowledge gaps and goal



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Gap:

Health and environmental
effects of emission of and
exposure to mine dust are
poorly understood

Meaningful data
needed to inform
strategies and
policies

Contentious
issues involving
multiple
stakeholders

Poor engagement
between experts
and lay-persons

Disciplinary silos
and polarised
viewpoints

Impact Statement:

Improved quality of life, health and environment of mining-impacted communities



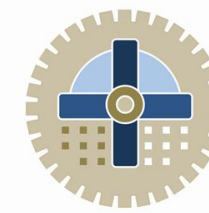
Collaboration since 2016



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Collaborative, multistakeholder network



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2016 2017 2018 2019 2020 2021 2022 2023 2024



environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA



WITS
UNIVERSITY



UNIVERSITY OF ZAMBIA



Loughborough
University



National Association for Clean Air



the federation for a sustainable environment

PARTICIPATION: The network aims to co-create integrated solutions with academics, policy makers, communities, and industry.

A tiered network approach



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WORKING GROUP IDEAS CANVAS

RESEARCH TOPICS	RESEARCH FUNDING	POPULAR PRESS
What topics require more research within your working group? Ecological Mapping of Hazards What are the health effects of ambient levels of silica (quartz)? What would be a suitable standard? Comparison of mining dusts Imp to understand dust composition especially mixed dust Imp to chemical properties of dust & variability presented to cause low health effects (immunological response) epidemiological studies on asbestos confounders as an vulnerable groups - TB, HIV	What available funding mechanisms exist to fund the topics you've identified? NIHSC, 2. NSF, NRF CANSA → Proteomics NRC → Universal Catalog NIH → Model-aid studies NIOSH → CSIR GHR → CIRA Minke Grady Foundation Health Effects Institute EDCTP UNH NIH CCRF animal funds	How are you going to communicate the findings of the working group to the public? What are we will you write for the website and popular press? → stay as far away as possible from press → Experts to write policy briefs & press releases in community newspapers eg. Social Media Internet → TV Public Inquiries → get a media hub on dust exposures hazardous exposure to town planning & community information & public health practitioners → Each research proposal to include Public Health (Public Understanding of Science & Technology) → Media briefing with Politicians & decision makers

② MITIGATION

RESEARCH TOPICS	RESEARCH TOPICS	POPULAR PRESS	CONCERN
Which topics require more research within your working group? • bring together natural dust sources knowledge with conditions relevant to mine dust → identify high risk sources of mine dust - specific areas of a TSP study together • permeable crust on a model system to manipulate behaviour of dust re-emit • technologies to eliminate/re-use dust re-emit dispose • review & evaluate existing technology for dust mitigation through a LCA - circular flow • key problem areas: dust piles & abandoned dumps → different approaches • hard roads & existing mines	What available funding mechanisms exist to fund the topics you've identified? • Mine Health & Safety Council funds research • Work Bank - funds re-emit studies • JRA → Kicker, Zonika • Minerals Council - Mandate PRECOT → knowledge network • ID2 - Trustee who had idea on it • mof, co 2c	How are you going to communicate the findings of the working group to the public? What articles will you write for the website and popular press? - Community Forum/ - Media - Regulatory authorities - where papers - Windy TV - wind data + more data - mix project - where was where? - check if 'rehabilitation' teaching see price / physical 'wind tunnel' at site as research tool	Which concern What topics - Mine - m - AI - GSI - ACC - NAC

① policy + LTRN

RESEARCH TOPICS	RESEARCH FUNDING	POPULAR TOPICS
Which topics require more research within your working group? <i>Less research fit in our course</i> 1. Does the environmental framework (bust specifically) withstand scrutiny of the contributors? 2. Occupational health/ Environment/ health - collaboration across govt depts. 3. Comparative governance across spheres around OH/EH 4. How does the law reflect scientific understanding of dust risk and exposure pathways? 5. Future generations project 6. Dealing with corporate withdrawal + corporate disress.	What available funding mechanisms exist to fund the topics you have identified? • Mine Health + Safety Council. • NRF • DTI - innovation? • Mine Qualifications Authority • Govt Companies wanting to do good - (be careful of NBS) • Minerals Council. • Research incentive funding at universities. <i>And the possibility of a diff. funder</i>	How are you going to connect the working group to the people you write for the website? • <i>Media</i> • Partnerships

	COMMUNITY
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ESS nutrals to the findings of public? What articles will and popular press? CONFERENCES Which conferences make the most sense to attend? What topics will you share in conference sessions? Mine Dust Network October NACA conference April ELA conference September Mine closure conference Minesafe - Moving Inclusion SAIMM Alt Mining Inclusion IAIA Mine Ventilation Society Land rehabilitation Society of SA	CONFERENCES ENGAGEMENT How will you communicate the findings within the broader community? Which platform/medium will be most effective for information sharing with communities in ODA countries? Benchmarks SAIMM Oct 2018 Parliamentary Portfolio Committee
JOURNAL ARTICLES How many journal articles will you aim to publish? Which journals will you aim to publish in? Journal Am no publication for SAIMM Journal SAJHR SAJW PER	

Exposure & health

Mitigation & rehabilitation

Policy & law

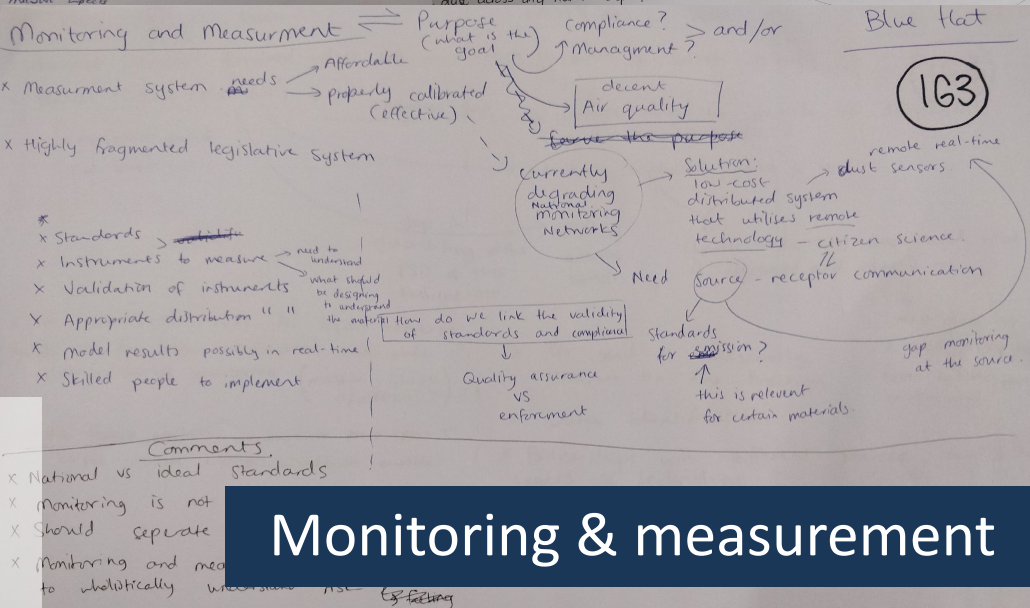
WORKING GROUP IDEAS CANVAS (4) "COMMUNITY"

RESEARCH TOPICS
Which topics require more research within your working group?
Toolkit development
Digital story telling
...
Wolfgang Thurn
GCRF
...
POPULAR PRESS
How are you going to communicate the findings of the working group to the public? What articles will you write for the website and popular press?
Need network to make it the job to recruit and write
CONFERENCES
Which conferences make the most sense to attend? What topics will you share in conference settings?
Nov 28th - Friday 9th Oct in Oct. (e-mail for display)
RESEARCHERS
Which members and students should be involved in each of the topics? Shouldn't have specific individuals, what the entities are you looking for?
JOURNAL ARTICLES
How many journal articles will you aim to publish? Which journals will you aim to publish in?
...
ps and concerns

Community awareness & education

Identifying gaps and concerns

Monitoring & measurement





MINE DUST NETWORK > WEST RAND

West Rand



West Rand Tailing Storage Facilities



West Rand Tailing Storage Facilities

Mine Dust Network

Compiled by Murad Esau and Aidan Wallace on behalf of the GCRF Mine Dust and Health Network

Rooigevaar in Saldanha: residents say red dust from Transnet's ore terminal is staining their homes and even their dogs

But Transnet says the dust falls below legal limits

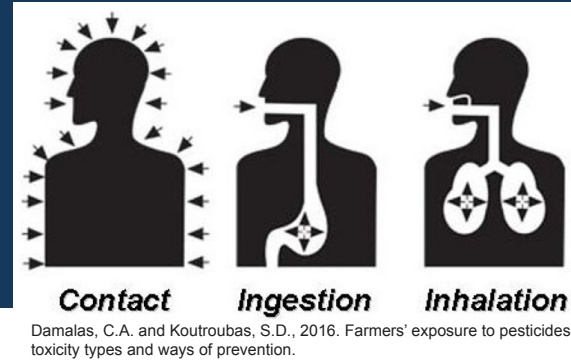
4 October 2024 | Text by [Liezl Human](#). Photos by [Ashraf Hendricks](#).

[News](#) | [Western Cape](#)

<https://groundup.org.za/article/rooigevaar-in-saldanha-residents-say-red-dust-from-transnets-port-terminal-is-staining-their-homes-and-even-their-dogs/>



Theme 1: Exposure & health



- Does mine dust have inherent ability to cause health problems?
 - Yes
- Numerous studies have addressed composition of mine dust
 - Components are known to result in adverse health effects (As, Hg, Silica, U, Radon)
- Assessing the health effects of environmental exposure to these contaminants inherently difficult to do
 - Several epidemiological studies to date
 - Extremely difficult to distinguish from other stressors/confounding factors
 - Most health risk studies cross-sectional = association, not causality

Theme 1: Exposure & health

Way forward?

- More research...
- Need money and time
- Comprehensive collaboration between different stakeholders, i.e. communities, TSF owners, research institutions, government
- Researchers often feel they do not have any influence on policy, try to communicate findings to communities in hope they will affect change (but causation-association issue a problem)
- Many loose ends to tie up
- What are people's lived experiences – how would you solve it? Think about organising it and a way forward?

Theme 2: Policy & law

- Complex in time and space
- Solutions not immediate or easy due to long history of mining and socio-politics
- Various terminologies used for mine tailings
 - Resource (above ground ore-body), waste product, by-product
 - Different classifications lead to different legislation being applied
 - 7 different acts related to issues dealing with mine residues, promulgated long after mining started

Theme 2: Policy & law

Need to differentiate

Historic operations

Current operations

Collective
solution required

Consensus
needed on size
of problem

What can be
done?

Timeframe?

Take into account

Geometallurgy

Different options
for reprocessing
and repurposing

Theme 2: Policy & law

Need to differentiate

Historic operations

Current operations

Many
challenges

Non-compliance, the failure to monitor compliance, poor enforcement, and a severe lack of coordination amongst especially government stakeholders exacerbate the socio-economic challenges faced by mining-affected communities

Theme 2: Policy & law

Need to differentiate

Historic operations

Current operations

Way forward?

Need to understand and map adequately amongst all the I&APs the consequences of the past, the consequences of the new and consequences that are associated with the trajectory of mining

Theme 3: Mitigation & rehabilitation

- What are potential solutions and interventions in avoiding emissions and/or exposure in perpetuity?
 - Erosion will distribute tailings for millenia – need to design differently
- Factors that influence TSFs management were stated as:
 - Economic
 - Legislation
 - Corporate culture
 - Material properties
 - Technical feasibility

Theme 3: Mitigation & rehabilitation

□ Integrated regional mining plan

Way forward?

- Regional tailings management plan
- All mining activities, across all political and administrative boundaries, spheres and competencies
- Collaboration, co-operation, co-design and co-management
- Prospecting to operating to closure, time span = decades!

□ Many questions concerning remining and superdumps...

- New facilities must be better in design, management and closure
- Opportunity to rehabilitate old footprints



TSF footprint

Theme 4: Community awareness & education

- Community dynamics and structures are complex
- Often poor and disempowered and in need of employment
 - Lack experience with large development projects and knowledge of impacts and benefits

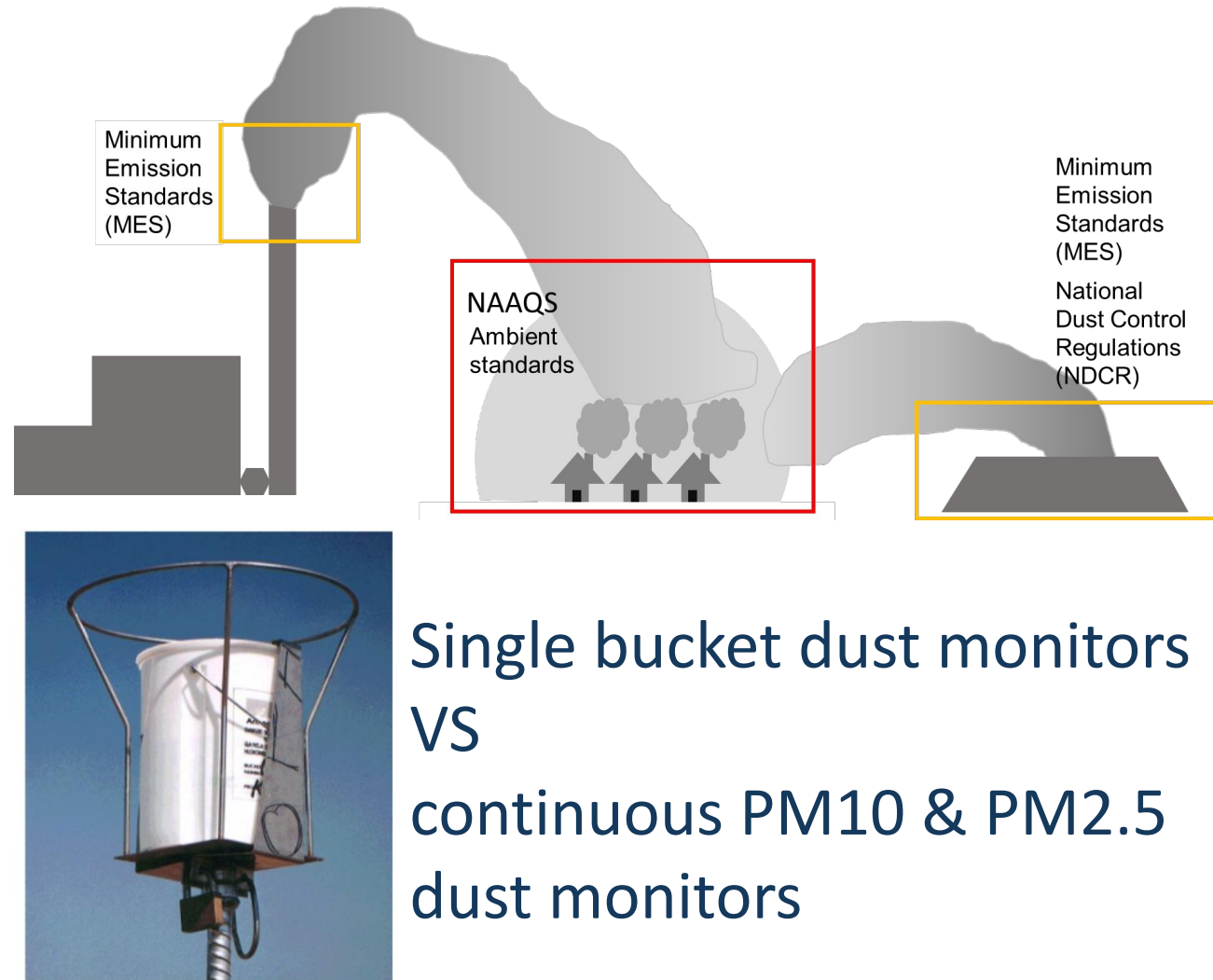
Way forward? □ Often high, often unrealistic expectations and inadequate awareness of their own rights

- Meaningfully engage communities on hazards, risks and impacts
 - Sufficient information made available in sufficient time
- Ultimate recipients of potential, ongoing and historical pollution and potential future land users
 - Must be involved in decisions regarding management and mitigation of impacts – have

Theme 5: Monitoring & measurement

- What is the purpose of m&m?
- What monitoring is currently being done and which measurements are involved?
- Is it adequate?

Way forward?





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- ❑ Complex, simple looking problems
- ❑ Challenges often seem insurmountable
- ❑ Need change of mindset and the will
- ❑ Trust is lacking
- ❑ Transdisciplinary dialogues
- ❑ Many people able and eager to contribute



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